

The Dairy.

Condensed Milk.

An immense quantity of milk now finds its way to England from Switzerland in a condensed form. The industry is of recent growth. It has passed through a great amount of derision, but is now an accomplished fact. John Bull is no longer wholly dependent upon *aqua pumpaynus*, chalk and sheep's brains for the wherewithal to dilute his maternal tea and coffee. The infant Bulls can now derive their supplies of bone and muscle from the mountains of Switzerland; the medium through which their little carcasses are built up being supplied in a condition but little inferior to the article as fresh drawn from the cow, and vastly superior to "new milk" which has passed through the hands of the average cockney milkman.

With the development of the cheese industry in Canada will arise the question, "what is to be done with the milk during the season when the factories are not at work?"

One way out of the difficulty is to feed the milk to pigs; another to make butter; yet another to make cheese at home on a small scale. But none of these ways promise so ready a relief as does the concentrating of milk (that is, the driving off of surplus water) for transport to the large cities, or for export to the crowded cities of Europe.

The process of condensing milk is an easy one, but the apparatus required is expensive, the chief items being a large vacuum pan and condenser, air-pump, boiler and engine, piping, and machinery to make the cans to hold the product. The manufacture is carried on in the United States to a large extent, the exportation amounting to \$200,000 a year. The largest establishment is at Elgin, Ill., where 8000 gallons of milk are used daily, the yield of about 3000 cans. The cost of the entire establishment there was \$30,000, but the price of the machinery has been considerably reduced and the machinery itself improved and cheapened in its construction since its starting. There are certainly large figures, but we do not see that they are out of the reach of Canadian dairymen, especially if it should happen that low prices for cheese should rule for a few years, and they should, in a manner, be forced to try other fields.

The process of condensing is described by Prof. Arnold in the *New York Tribune*. From his article we extract the following.—The milk for condensing must be of the best quality. The condition and quality of milk which are often accepted at butter and cheese factories, and sold in cities and villages, would not answer at all for condensing. If feverish or tainted, or produced from strong-flavoured food, or where the cows drink stagnant water, or are worried by dogs or otherwise, or where it is carried warm to the factory, it is ruined for condensing. The milk must not only be perfect, but it must be carried to the factory cold and in full vessels, so that it shall not churn on the way. The conditions for the Elgin factory require that the producer shall cool his milk in summer to 58° or below within 45 minutes after milking—the night's milk to remain all night in water not above 52°, and the morning's milk not to be over 60° when it arrives at the factory. In winter the night's milk must be cooled within an hour below 50°, and the morning's milk below 55°. The night's and morning's milk must be cooled separately before mixing, and no "strippings" or cream are ever to be reserved. Though no cheese factory ought ever to receive milk inferior in quality, the fact that they often do so compels the condensing companies to pay about one-half cent per quart more than it is worth for butter or cheese.

The general course pursued with milk at the condensing factories is to receive it by measure in cans of eight gallons, or some other certain size, and cold as above stated. The cans are emptied into a receiving vessel, from which, after being inspected, it is discharged into a cold receiving tank. When all is received, which is usually done once a day, and ready for working, it is drawn into a heating tank and raised to the boiling point, and one pound of white sugar for every ten pounds of milk is mixed with it. When the sugar is thoroughly dissolved, the whole is drawn by suction into a vessel called the vacuum-pan, which should be large enough not to be more than half filled with the amount to be condensed. The vacuum-pan is a close

vessel, made now of cast or boiler iron, and is heated by steam-pipes in the lower part of it, which pass directly through the milk. The vessel is usually somewhat of a jug shape. With the top of the empty space above the milk is connected the duplex exhaust air-pump which is rapidly driven by a powerful engine, giving 10 to 12 horse power for each thousand gallons of milk condensed. The action of the pump exhausts the top of the pan of air, steam and vapor as fast as it forms, and reduces the pressure in the pan so much that the milk will boil and foam rapidly at 140°. Between the pump and pan is placed a condenser, which by means of jets of cold water, condenses the steam and vapor and aids efficiently in producing a vacuum over the milk and thereby hastening the evaporation. Water to the amount of 75 per cent of the weight of the milk is evaporated in from three to five hours, when the mass is reduced to the consistency of half-grained honey. The pump is then stopped and the mass raised to a boiling heat, and then drawn out into large cans, which are rotated in a pool of cold water till it becomes cool, when, by an ingenious machine, it is run into tin boxes holding just a pound each and the boxes soldered air-tight. It is then ready for market, and will keep an indefinite length of time. In some cases the milk is condensed without the addition of sugar. If it is sealed air-tight while boiling, hot, it will keep indefinitely, like canned fruit, but will soon spoil upon being opened. When mixed with sugar at the rate named it will keep well a long time after the cans are opened.

Another course pursued by some is to condense only the skim milk, canning it hot and without sugar. Of course it would not keep when opened, unless sugar was added, but the product is palatable and wholesome and is rich in nutrition, and answers most of the purposes for which milk is used, by simply adding water enough to liquify it. If a market could be worked up for it in this shape, it seems to me it would be the most appropriate use that could be made of the large amount of milk that must be skimmed to furnish the necessary supply of butter. It would certainly be a much better use than to make it into any form of skim cheese, which is becoming such a drug in the markets, and toward which there seems to be a growing hostility.

It is an essential point in the successful condensation of milk, that, while drying, the heated milk should be relieved to a considerable extent of atmospheric pressure, in order that evaporation should go on rapidly, and at a low temperature, otherwise the process would be too slow to be practicable, and the milk would adhere and burn on the sides of the evaporating vessel, and the tubes passing through it, occasioning loss, bad flavor, and much labor to remove the adhering milk. In the mode of condensing I have described, the pressure is removed by connecting the exhaust pump with the vacuum-pan. There is another mode of doing this which I have not had the fortune to see in operation, which is said to be cheaper than the pump and pan. It is to remove pressure, and at the same time vapor, by rapidly rotating a fan above the hot milk, driving the air and vapor away by a forced current, on the same principle that a blast is created in a furnace. The pump and vacuum-pan are, however, most in use.

The great burden of expense attending condensed milk lies in canning and setting, rather than in removing the water from it. In factories working 5,000 gallons or above per day, the requisite amount of water can be evaporated for one cent per gallon, while the condensed gallon, counting in the sugar, will fill three pound cans which will cost two and a half cents each, or seven and a half for the gallon of crude milk. The additional expenses of packing, boxing, transporting and selling, bring the condensed article so high as to find a serious competitor in crude milk.

Calves for the Dairy.

In breeding cattle for the dairy a different system should be followed than when the stock is designed for the shambles. It is a great mistake to let calves intended for cows suck their mothers, or to feed them to such an extent that they are made good veals—calves thus bred do not make good cows for the reason that there is an undue development of fat and muscle, and a consequent want of development of lacteal qualities. Any milking breed of cattle bred in this way will deteriorate. The proof of this statement, is the history of the Short-horns, which breed having been bred on the stuffing principle, contains hundreds of cows which do not give milk enough to raise their own

offspring. Calves which suck are very likely to have thick, heavy necks, heavy shoulders, coarse bone and muscles.

The most successful dairy breeder with whom I am acquainted never allows his calves to suck at all. My practice is to let them suck until a week old. I think this is an advantage to the cow, reducing the inflammation in the bag, and also preventing nervous excitement on the part of the mother at a time when such excitement might be very injurious. After the calf is a week old, it may be removed from the mother's sight without any injury to the dam, and meanwhile its digestive organs have been exercised naturally and the young animal is better fitted to be fed. It is, however, a fact that a young calf will grow faster and look nicer when sucking a very small amount of milk than when fed three times the quantity out of a pail. The reason of this is because, when sucking, the saliva is abundantly secreted and mixed with the milk, which promotes digestion and assimilation, whereas, when the milk is drunk, there is no secretion of saliva. It will not pay, however, for the dairyman to raise calves in this way, unless the milk of a cow could be divided among several calves, each one sucking its portion in its turn.

To have a cow as profitable as possible, in the flow of her milk, she should be kept entirely separate from her calf. Calves can be raised on skim milk, and will do well. If the milk is scarce, it can be mixed with a tea made by boiling bright clean hay. A calf can be raised on four quarts of milk—two at night and two in the morning—with the addition of hay tea. When three weeks old they will begin to eat a little hay or grass, and when four weeks old a little oat or linseed meal. If kept growing all the year round, calves raised even on such scanty rations will make good animals. Many a fine Jersey from superior stock has been spoiled in the rearing, and instead of making a good cow with a fine udder and milking developments, has made a meaty, coarse, useless female steer.

Calves should be halter-broke when young, and made so tame that they can be approached anywhere. Animals thus handled are never so liable to accident as when allowed to grow up wild and ungovernable, and besides, they are so much better to manage that this fact alone will compensate for all the trouble in breaking them. Often more time is spent in trying to force an unbroken cow or bull into a car or stable than to halter-break a dozen calves. Calves should never be handled about the head, unless to put the halter on them, or touched on their horns, or have their ears pulled, as such kind of petting is almost certain to make them ugly, and, when they grow up, dangerous. No animal is more grateful for a little extra feed in the winter than the calf, and none will show its effects more. The farmer who raises a few roots for his calves and forgets not a little meal will surely enjoy a lively frolic and a run when in the spring time he opens the gate and leads his pets into the green fields.—*New York Tribune*.

HOLSTEINS AS MILKERS.—G. S. Miller, a dairyman in the State of New York, has been able to report some very large yields of milk from his Holsteins. His latest report gives 70 2/7 lbs. of milk per day for a week from Crown Princess, and an average of 46 1/3 lbs. per day for a week from four Holstein cows. One cow when four years old had produced three calves and 14,520 lbs. of milk.

DESIRABLE POINTS IN JERSEY COWS.—Col. George L. Waring names the points he considers most desirable in Jersey cows as follows: Good scutcheons or milk mirrors, combining width, height and uniformity; evenly developed large udders, with a good width and depth behind, and running well forward under the belly; large and evenly placed teats; full and knotted milk veins; heavy hind-quarters and light fore-quarters; thin necks; yellow-lined ears, and small horns, free from much white. Coloring of hair and size has been disregarded, and even form has been held secondary.

TO PREVENT A COW FROM SUCKING HERSELF.—A correspondent sends to the *Rural New Yorker* what that journal calls "an excellent method, probably the best," to prevent cows from sucking themselves:—Take a half-inch board, five or six inches square; cut a hole with an inch and a half or inch and three-quarter augers close to the edge that part of it is cut away; apply this to the cow's nose, using the slit to hold it on, and the work is done. No cow thus provided will attempt to suck herself or any other cow, and Mr. Smith assures us it does not interfere with her in pasture.

DROP AFTER CALVING.—In the *Norfolk News* of April 9, 1872, there appeared a letter from Chas. Crawshaw, Esq., of Hingham, Norfolk, describing his successful treatment of two cows with stimulants. He had previously lost five Alderney cows successively from the same kind of fever, but under a different method of treatment, that is, bleeding, &c. The "two cows (one an Alderney and the other a Norfolk polled cow) were attacked with milk fever 12 hours after calving." Acting upon the advice of Mr. Woods, of Merton, he "had recourse to stimulants, the effects of which were perfectly marvellous." He "gave each cow half a pint of brandy with one quart of strong ale every four hours for two days, and after the fourth dose both cows rose from the ground and began to chew their cud, and in about three days rallied and recovered their milk. Both were in 12 days milked as if nothing had ailed them."